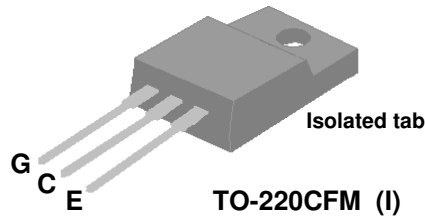


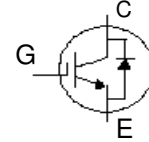


**N-Channel Insulated Gate Bipolar Power Transistor**

High Speed Switching  
Low Saturation Voltage  
Typical  $V_{CE(sat)} = 1.7V$  at  $I_C=12A$   
Industry-standard isolated package  
RoHS-compliant, halogen-free



$V_{CES}$	600V
$I_C$	20A



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{CES}$	Collector-Emitter Voltage	600	V
$V_{GE}$	Gate-Emitter Voltage	$\pm 20$	V
$I_C$ at $T_C=25^\circ C$	Collector Current	25	A
$I_C$ at $T_C=100^\circ C$	Collector Current	12	A
$I_{CM}$	Pulsed Collector Current <sup>1</sup>	50	A
$I_F$ at $T_C=100^\circ C$	Diode Forward Current	8	A
$I_{FM}$	Diode Pulse Forward Current	40	A
$P_D$ at $T_C=25^\circ C$	Maximum Power Dissipation	33	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	150	$^\circ C$

**Notes:**

1. Pulse width limited by maximum junction temperature.

**Thermal Data**

Symbol	Parameter	Value	Units
$R_{thj-c}$	Thermal Resistance Junction-Case	3.8	$^\circ C/W$
$R_{thj-c(Diode)}$	Thermal Resistance Junction-Case	5	$^\circ C/W$
$R_{thj-a}$	Thermal Resistance Junction-Ambient	65	$^\circ C/W$

**Electrical Specifications at  $T_J=25^\circ C$  (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_{GES}$	Gate-to-Emitter Leakage Current	$V_{GE}=\pm 20V, V_{CE}=0V$	-	-	$\pm 100$	nA
$I_{CES}$	Collector-Emitter Leakage Current	$V_{CE}=600V, V_{GE}=0V$	-	-	1	mA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=12A$	-	1.7	2.2	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=25A$	-	1.9	-	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{CE}=V_{GE}, I_C=250\mu A$	2	-	6	V
$Q_g$	Total Gate Charge	$I_C=20A$	-	95	150	nC
$Q_{ge}$	Gate-Emitter Charge	$V_{CC}=480V$	-	16	-	nC
$Q_{gc}$	Gate-Collector Charge	$V_{GE}=15V$	-	35	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=480V, I_C=20A,$	-	40	-	ns
$t_r$	Rise Time	$V_{GE}=15V,$	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=5\Omega,$	-	140	-	ns
$t_f$	Fall Time	Inductive Load	-	200	400	ns
$E_{on}$	Turn-On Switching Loss		-	0.1	-	mJ
$E_{off}$	Turn-Off Switching Loss		-	1	-	mJ
$C_{ies}$	Input Capacitance	$V_{GE}=0V$	-	2760	4400	pF
$C_{oes}$	Output Capacitance	$V_{CE}=30V$	-	65	-	pF
$C_{res}$	Reverse Transfer Capacitance	$f=1.0MHz$	-	40	-	pF

$V_F$	FRD Forward Voltage	$I_F=8A$	-	1.8	2.4	V
$t_{rr}$	FRD Reverse Recovery Time	$I_F=8A$	-	30	-	ns
$Q_{rr}$	FRD Reverse Recovery Charge	$di/dt = 100 A/\mu s$	-	30	-	nC

**Ordering Information**

**AP20GT60ASI-HF-3TB : in RoHS-compliant halogen-free TO-220CFM, shipped in tubes (50pcs/tube)**

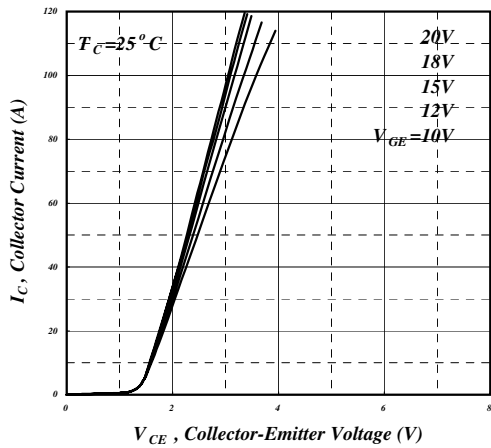


Fig 1. Typical Output Characteristics

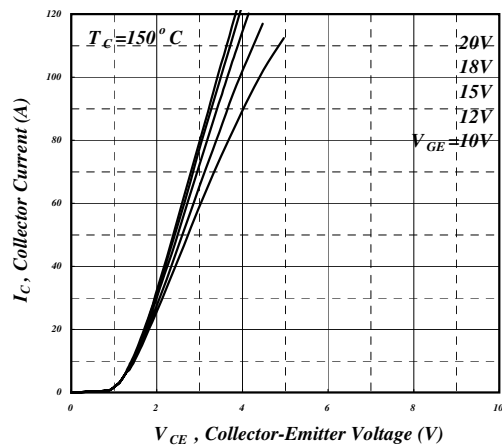


Fig 2. Typical Output Characteristics

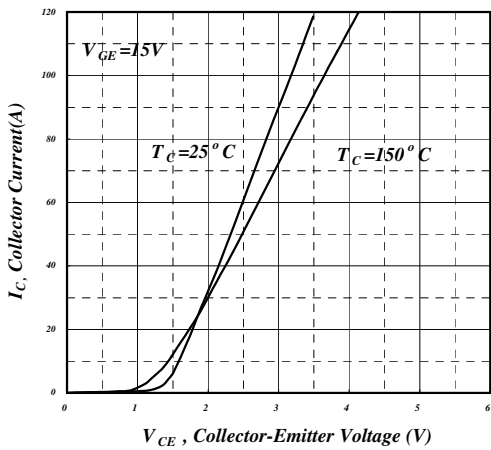


Fig 3. Typical Saturation Voltage Characteristics

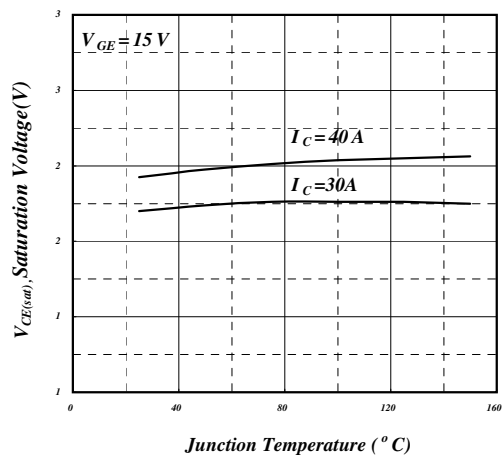


Fig 4. Typical Collector-Emitter Voltage vs. Junction Temperature

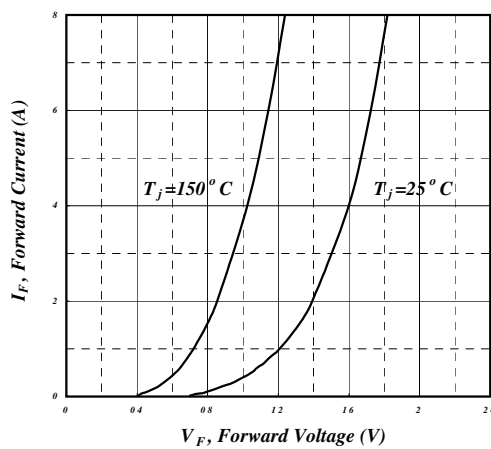


Fig 5. Forward Characteristics of the Diode

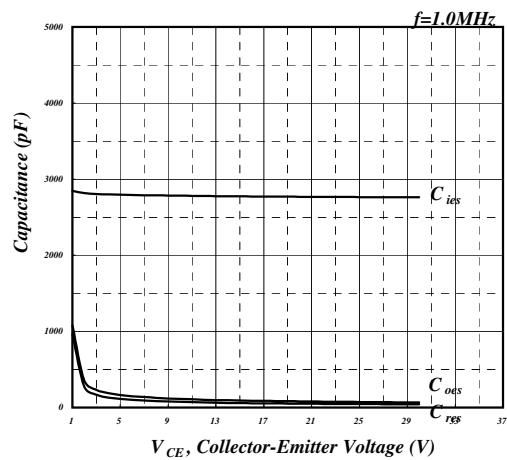


Fig 6. Typical Capacitance Characteristics

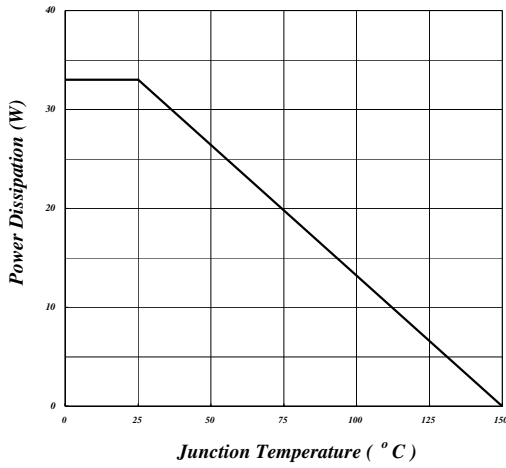


Fig 7. Power Dissipation vs. Junction Temperature

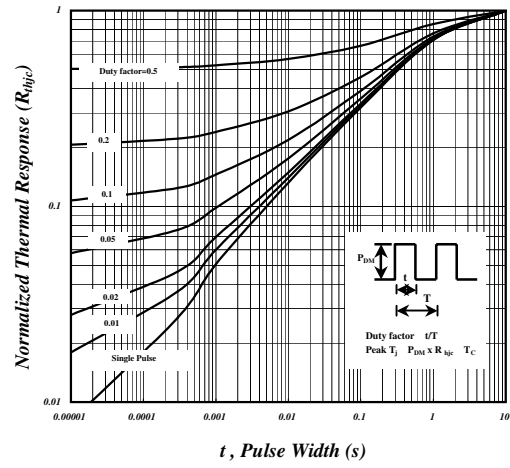


Fig 8. Effective Transient Thermal Impedance

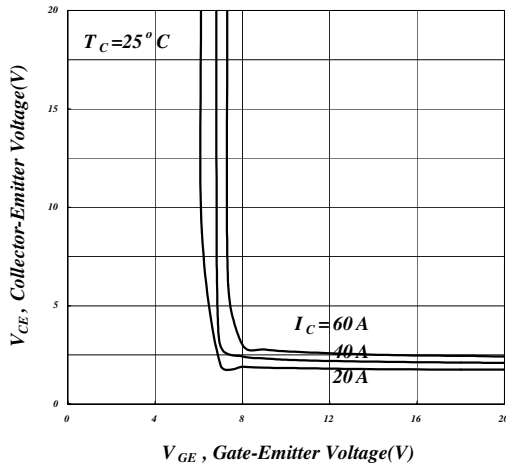


Fig 9. Saturation Voltage vs.  $V_{GE}$

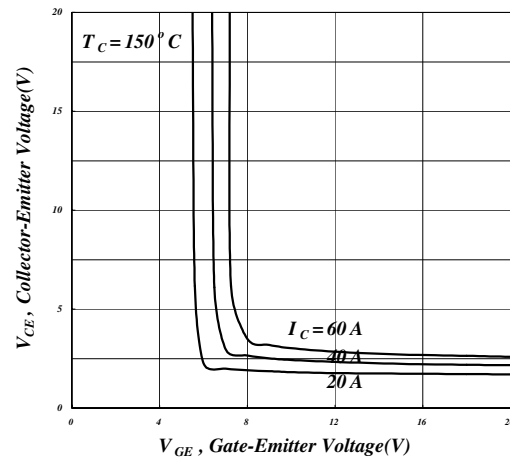


Fig 10. Saturation Voltage vs.  $V_{GE}$

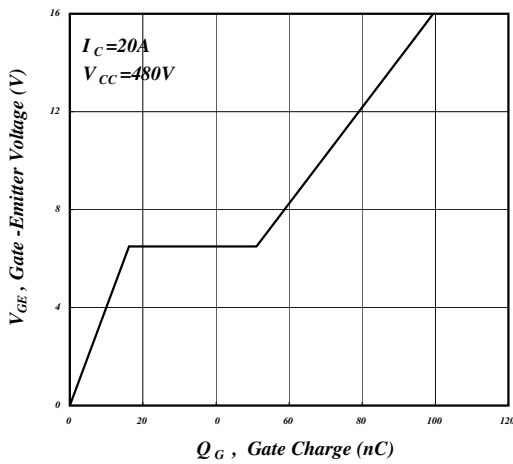


Fig 11. Gate Charge Characteristics

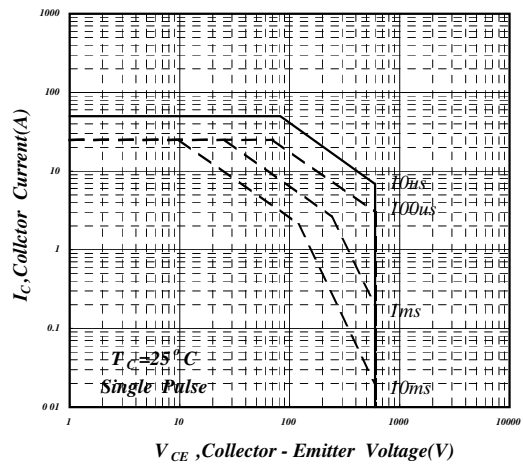
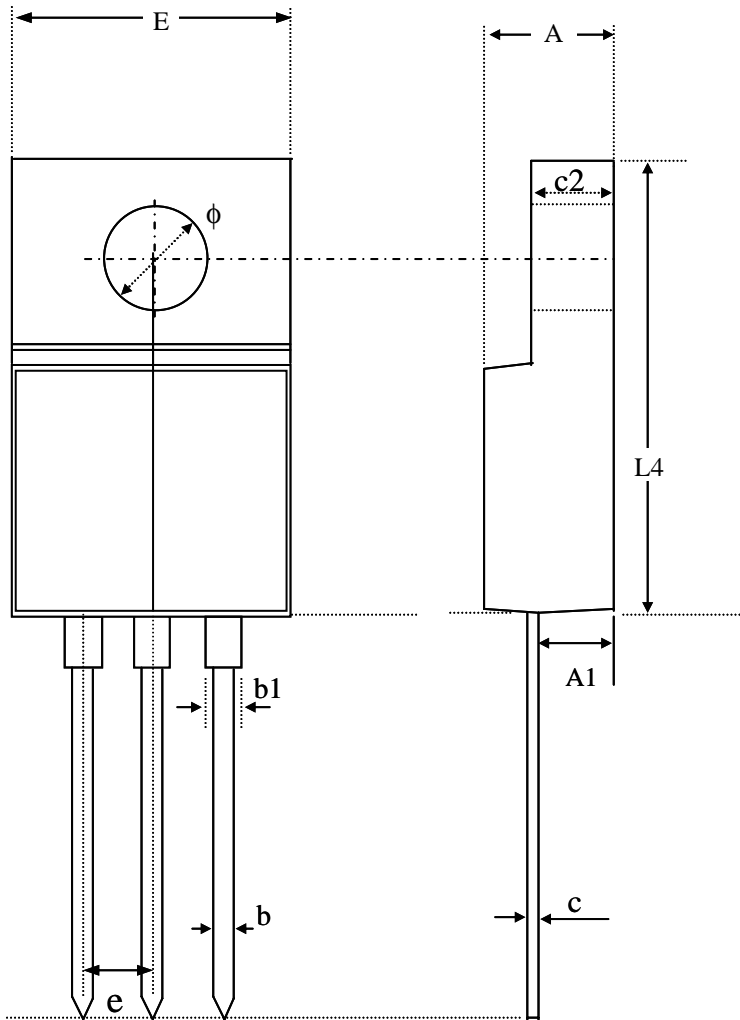


Fig 12. SOA Characteristics



**Package Dimensions: TO-220CFM**



SYMBOLS	Millimeters		
	MIN	NOM	MAX
<b>A</b>	4.30	4.60	4.90
<b>A1</b>	2.30	2.65	3.00
<b>b</b>	0.50	0.70	0.90
<b>b1</b>	0.95	1.20	1.50
<b>c</b>	0.45	0.65	0.80
<b>c2</b>	2.30	2.60	2.90
<b>E</b>	9.70	10.00	10.40
<b>L4</b>	14.70	15.40	16.10
$\phi$	----	3.20	----
<b>e</b>	----	2.54	----

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

**Marking Information:**

